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UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

BRANCH OF RESEARCH

MONTHLY REPORT

OF

FOREST EXPERIMENT STATIONS
FOREST PRODUCTS
FOREST ECONOMICS
RANGE RESEARCH

NOV 1930

M—5105

U. S. GOVERNMENT PRINTING OFFICE: 1930 J63661

BRANCH OF RESEARCH

November, 1930.

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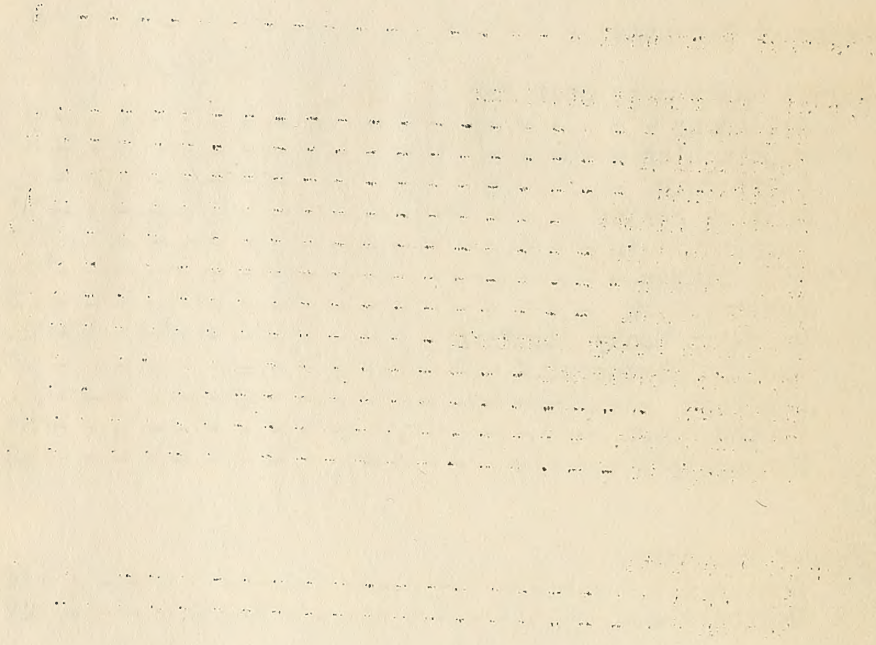

RESEARCH PERSONNEL

The number of employees, including pending appointments, engaged in the Branch of Research on October 1, was 445. Among major lines of work and character of service, these are distributed as follows:

	Professional	Clerical	Sub-professional	Custodial	Total
Administration	1	4	-	-	5
Products	102	52	22	28	204
Economics	45	17	-	-	62
Range	20	6	-	-	26
Silviculture	89	53	5	1	148
Totals	257	132	27	29	445

(Over)

ALLEGHENY FOREST EXPERIMENT STATION

General

The Station is congratulating itself on the arrival of Mr. K. D. Doak, Purdue '26, the second of the two men assigned to the Station by the Bureau of Plant Industry. Doak will collaborate with Hatch in the joint study of mycorrhiza.

Wood completed a brief account of the Camp Ockanickon Headquarters tract, which should be useful not only to the technically trained man visiting the Camp, but also to the faculty of the University, which we would like to encourage to do botanical and zoological work there.

Influences

In reply to the recent circular letter from the Branch, Forbes urged that funds be made available to undertake two influences projects at the Allegheny Station. The lesser of these would parallel the Wagon Wheel Gapp experiment, but under eastern conditions. The work would be done at the Kane Experimental Forest, where various methods of cutting are to be tried anyway, and where it should be possible to obtain stream-flow records on two small watersheds. Recent opposition to the cutting of any timber at all on the Allegheny National Forest, because of possible adverse effects on the regimen of the streams, makes a study of this kind particularly valuable. The major project, however, is one peculiar to a territory in which the problem of municipal water supply is already acute, and promises to become more so in the future. What we propose is a thorough-going study of the effect of forest vegetation, and possibly other types of vegetation, upon the run-off of watersheds on which such urban centers as Philadelphia and northern New Jersey will in the future depend for potable water supplies. This project of course would include a study of transpiration rates from different types of forests, the relative merits of different kinds of humus as filters for rainfall, and the effect of different methods of silvicultural management upon total stream-flow. Judging from the great conflict between such few statements as have been published concerning these matters, there is every need for such studies in the relatively humid East. Forbes has been endeavoring to interest the Regional Planning Federations of Philadelphia and New York, the latter including much of northern New Jersey, in this type of investigation.

Mensuration

Schnur's measurement and weighing of 111,000 pounds of mine props in the Poconos have yielded the following data on green weight

Species	No. of trees	Volume of props, cubic feet	Green weight lbs. per cu.ft.
Red maple	45	732	53
Sugar maple	3	103	58
Yellow birch	22	281	59
Black birch	17	282	59
Black cherry	4	64	50

He has been putting this information into alinement chart form. These charts will permit the calculation of the weight of a prop of any dimension. Schnur has small samples from the same material, from which he expects to obtain oven-dry weight also. Props in the anthracite region are bought by the ton just as they come from the woods.

Morey has been analyzing seedlings of various species obtained in the immediate vicinity of Heart's Content, and has been working up stump taper curves for the Heart's Content species, in order to present data for total age correlated with d.b.h. Height data are also being prepared for similar presentation. So far the most interesting fact unearthed is the great difference in growth rate of hemlock on the flat in Heart's Content and the adjacent slopes:

Age	Flat		Upper Slope	
	D.B.H. (inches)	Height (feet)	D.B.H. (inches)	Height (feet)
50	1.0	8	2.2	14
100	2.8	24	7.4	39
150	7.2	44	15.3	71
200	11.3	67	27.0	100
250	15.8	87	43.2	111
300	20.8	101	*	*
350	26.2	109	*	*
400	31.8	114	*	*
450	37.6	118	*	*

*No trees older than 300 years were found on the upper slope.

Sections of 15 hemlock stumps, the oldest of them 550 years old, with the accompanying data, were shipped to Dr. A. E. Douglass in Arizona.

Types

Hough's preliminary examination of the stand data from the virgin tract on East Tionesta Creek indicates that there are no essential differences in composition of the forest on the flats (plateau tops) and slopes. With Jackson's cooperation he made pH determinations for two soil samples from this tract, which will later be sent to New Brunswick for mechanical and chemical analysis. The extreme acidity of this tract is shown by the following table:

Sample I Near E. Branch of Tionesta Creek			Sample II Plateau above creek		
Profile	Depth	pH	Profile	Depth	pH
F	2"	4.0	F	1½"	4.1
H	1½- 2"	3.9	H	2"	3.4
A	2"-2½"	3.7	A	2½-3"	4.0
B_1	¾"-1"	3.7	B upper	12"	4.6
B_2	13" below surface	3.9	B lower	22"	4.6
B_3	19"	4.5			
C	37"	4.4			

Wood and Miss Loose have been spending a good deal of time in the tabulation of the data on vegetation at Camp Ockanickon as correlated with soil types. The following table gives a good idea of the composition of the tract as a whole. It is based on strip surveys covering 441 tenth-acres, well-distributed among the various types:

Number of plots upon which each species occurs, by basal area per cent.

Per Cent	Chestnut oak	White oak	Pitch pine	Black oak	Post oak	Red maple	Black gum	Hickory	Sassafras	Gray birch	Magnolia	Black cherry	Shortleaf pine	Scrub pine
0-10	48	112	92	199	220	115	128	135	117	12	13	17	19	18
10-20	31	69	47	32	32	13	8	2	1	1	4	1	3	2
20-30	35	57	29	10	6	4	3			3	1			1
30-40	39	50	36	2	1	2				2				2
40-50	33	24	32	1		5							1	
50-60	23	14	28			3							1	
60-70	33	8	13			2								
70-80	21	13	14											
80-90	27	1	17											
90-100	7	1	89			1								
Total	397	349	397	244	259	145	139	137	118	18	18	18	24	23

Protection - animals

Morey put into form for publication a note on porcupine damage in the East Tionesta tract. If anyone has a first-class picture of a porcupine actually at work on a tree, we should be delighted to obtain a print for this use.

Pathology: (October and November)

The principal activities of the branch office of Forest disease investigations have been, firstly, a continuance of the organization of new laboratory facilities and, secondly, preparation of old data for publication.

The Philadelphia office was endowed with automobile facilities when Mr. Bedwell gave us, on October 17, the Chevrolet truck which he had been driving last summer on a chestnut blight survey.

Jackson made a short trip to Dover, Delaware, where he conferred with State Forester Taber on nursery disease problems. A check was made on the efficacy of various treatments recommended last summer for the abatement of certain quite serious troubles in the state nursery near Milford. Soil pH tests were made in the various treated and untreated beds. Plans are being drawn for the spring-1931 seed-bed treatments.

Two trips were made to Camp Ockanickon by Jackson and Doak. Doak made several micorrhiza collections. An examination of the May, 1930, burn on the Camp Ockanickon tract revealed several striking things from a pathology standpoint. Among these was the great abundance of what appears to be a little-described Ascomycete. This spreads extensively thru the inner bark, and eventually ruptures the outer bark. It is evident on nearly every oak in the burn, regardless of species. This particular burn certainly affords an excellent opportunity for someone to check the effect of fire on the pH of forest soils, over a term of years.

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APPALACHIAN FOREST EXPERIMENT STATION

General

Frothingham attended the meeting of the Southern Forest Research Advisory Council, at Alexandria, La., November 7 and 8, visiting the Southern Station's experiments at Urania and the Catahoula National Forest Unit. He then accompanied Munns to the scene of the erosion

studies in northern Mississippi, returning to New Orleans via Bogalusa, La., where the experiments on the 27,000 acre plantations of the Great Southern Lumber Company were inspected with Munns and Wakeley. Frothingham then visited the Southern Station's turpentine and thinning experiments at Starke, Fla., and the Ocala National Forest, returning to Asheville on the 24th.

Forest management study in north Georgia

After spending two and one-half months in north Georgia on a survey and growth study of mountain hardwoods, Hursh and Daley returned to the office. Abell and Stone are proceeding with the field activities, with headquarters at Blairsville, Ga. This study has attempted to assemble available information on the nature and distribution of mountain hardwood forests that occur above 2,000 feet elevation in northeastern Georgia. The majority of the land lies either in the National Forests, or is in the hands of two large companies.

A second phase of the problem is now being completed by Abell which will attempt, by actual analysis of selected areas, to furnish some information as to the representative condition classes that now obtain throughout the region being studied.

As a part of the field procedure individual tree records have been obtained for approximately 1,800 trees, including the radial growth for the past ten and twenty years. These data will be used as a basis for a general study of growth of mountain hardwoods. Due to the uneven age and irregular growth rate on the mixed hardwood stands encountered, it was found to be necessary to bore every tree on many of the sample plots in order to furnish a satisfactory basis for determining actual periodic basal area increase.

Under Abell's supervision the establishment of three treatment and growth plots with controls is being completed on the Georgia Mountain Experiment Station forest. A pole thinning of approximately one acre has been completed in the plateau oak type. A fuelwood sanitation cutting is now in progress in a cut-over oak stand on the same area. A complete clear cutting of a heavily cut mixed hardwood area is also in progress. The actual cutting is being done by a crew of four local woodcutters, who are being paid at a rate of $1.25 per day. The time, costs, and amount of wood removed have not yet been computed.

A study of some sixty sample plots has shown that cut-over and culled stands are, in general, making poor growth. At the same time a considerable amount of excellent old field growth was encountered during the field survey. Three distinct types of old field growth are found; (1) Virginia and shortleaf pine in mixed or pure stands, (2) red and white oaks with some admixture of hickory and other hardwoods, and

(3) mixed or pure stands of yellow poplar. One pure Virginia pine stand was tallied near Hiawassee, Ga., that averaged 75 feet in height at 40 years, 360 stems per acre in the upper story averaging 9 inches d.b.h., and yielded approximately 53 cords, with bark, per acre. A number of the old field poplar stands in the upper north coves show a height growth above the best sites given in available yield tables. The computation of the growth data has been begun by Hursh and Daley.

Forest pathology

Approximately 1,500 Asiatic chestnut seedlings were planted on or near the experimental forest at Bent Creek by Nelson, in April of this year. The five planted areas represent twelve collections under different climatic conditions in the Orient. A good survival was obtained in spite of the drought, and with the exception of one plot on an extremely dry site, 65 per cent to 85 per cent of the seedlings were alive at the end of the first growing season. The main leaders on a number of plants were killed but in most cases these plants have sprouted at the base and will probably make good growth in the future.

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CALIFORNIA FOREST EXPERIMENT STATION

General

Marsh and Granger visited the Station during the month. Marsh devoted most of his time in going over the Station's program with special emphasis on proposed work in the field of economics.

The fire studies are finally under way. Gowen, Curry, and Brown will devote the next two months on detailed studies of the detection problems on the Shasta National Forest. Preliminary work on this experimental forest unit has already shown that one of the weak links in fire control is detection. One of the important jobs will be to determine the best method of making visibility maps, and how to utilize them by the administrative organization.

H. L. Person's transfer from Entomology has been approved by the Secretary. He will be assigned to redwood studies.

Management

Since November 1 the management section have been engaged in the prosaic task of tabulating data collected during a long field season and previous ones. Not that there was nothing more to do in the field, but

roads and quadrats are covered with snow. The last few days in the field were spent in hastily extracting and placing on screened plots seed pilfered from squirrel hordes.

R. H. May was called back to Ann Arbor by the death of his father. W. Gibbs has been engaged to halp Agri and Hasel with the Mc computing.

Twenty Mc, 23 Mt, and 3 ME progress reports are due before next field season, besides an Mc bulletin, numerous working plans, brief articles, maps, etc.

Southern California

Forestation

On a trip to Feather River Nursery in October Kraebel arranged for the continuation of planting experiments in burned areas on the Plumas Forest, and for the distribution of planting stock to several other forests on the west slope of the Sierras. Heavy culling was necessitated by the immaturity and poor growth of a large proportion of both Jeffrey and western yellow pines. The nursery soil will be treated with sand, humus, and various fertilizers in an effort to determine the proper corrective measures.

At Devil Canyon Nursery 25,000 conifers embracing 24 species are in the transplant beds for experimental planting and general distribution. Only one species, Pinus sylvestris var. mongolica, shows by its poor development that it need no longer be considered for use at the southern branch. Two good rains in November have made possible the beginning of planting operations three months earlier than last season. The month was marked by almost continuous wind, culminating on November 22 in a burst of destructive violence which did much damage throughout Los Angeles and San Bernardino counties, overturning and breaking off the crowns of many trees which have withstood the storms of half a century.

In cooperation with Supervisor Elliott a ten-acre tract was selected in a large burn in the mixed conifer type of the San Bernardino Forest for intensive planting in an effort to prevent the capture of the area by chaparral. Wire for fencing the area was purchased by the Station, and will be strung by the Forest force. This burn, which extends over several thousand acres northward from the south crest of the San Bernardino Mountains in a region of high recreational value, has so little coniferous reproduction that its conversion to chaparral is inevitable unless it can be prevented by planting.

Special trips

Following the two-day water-relations conference in October at Devil Canyon, Kraebel accompanied Mr. A. D. Lindsay, of the Australian Forest Service, on a tour of southern California to observe the development of the genus Pinus, both natural and planted, and incidentally of

the genus Eucalyptus. In many cases planted Monterey pines, benefitting from adjacent orchard or lawn irrigation, exhibited growth rates equal to the rapid growth of the same species in East Australia and New Zealand. Although wide variation in regard to dormancy is characteristic of planted Monterey pine in California, it is apparent that in the favorable temperature of lowland southern California this species needs only an adequate water supply to make phenomenal increment. Under such conditions active growth continues throughout the year and "dormant" buds are not formed.

In November W. R. Chapline stopped "between trains" in San Bernardino but prolonged his visit to inspect the water-relations installations at Devil Canyon and then to drive with Kraebel on a rapid examination of grazing lands in the foothills northeast of Bakersfield, and in the southern Sierras and the Tehachapi Mountains. This rapid two-day trip traversed in Kern County some of the most spectacularly under-watered, overgrazed and eroded country to be found in California. The surface vegetation having been completely consumed by sheep and cattle during recent years of sub-normal rainfall, the land is now being exploited by hogs which are able to subsist on roots.

S. W. Phillips, Scientist in Soil Erosion of the Bureau of Soils Station in Oklahoma, spent a day at Devil Canyon going over the influences work there with Lowdermilk and Kraebel.

Forest Influences

The heavy wind and rain storm of mid-November kept all hands at the Devil Canyon Branch busy servicing the instruments. For the first time since the installation of the small Parshall flume to measure minimum run-off flows at Barranca Watershed, Kraebel was able to observe this instrument in action. He found it necessary to assist the movement of sand through the flume to prevent clogging and consequent false record. Clogging can be avoided by increasing the gradient of the approach channel, a procedure which will require special calibration of the flume for the increased velocities. Even with such changes it will never be wise to trust to the perfect functioning of such automatic recording instruments in the field, and in any future study of this nature provision should be made for personal attention to the instruments during all storms.

Road fill/Erosion Control

A newly-built high-gear road, displacing an old road up the steep south front of the San Bernardino Mountains, has involved unusually heavy cuts and fills. Two effects of this road have caused considerable adverse criticism: first, the ugly scarring of the mountain-side by a

road whose chief purpose is to make accessible the beauties of mountain and forest; second, the vast quantities of sand and silt brought down by erosion from the raw "fills" into the streams below the road. This latter result has entailed costly damage to the water spreading grounds of the city of San Bernardino which have been seriously clogged by erosion debris, requiring practically the reconstruction of much of the system of canals, ponds, and diversion dikes.

Because this road is typical of many similar forest road projects which will be undertaken in coming years, it was believed advisable to find some means of fixing the loose fills to prevent excessive erosion from them during the first rainy season after construction. Admittedly the slopes become more or less solidified and stable in a very few years, but experience has shown that erosion during the first winter can reach the proportions of an actual catastrophe.

After conference with officials of the State Highway Department, a small cooperative experiment was installed on one slope. Control methods used were seed dispersal on smooth slope, seed sowing in contour trenches 24 to 30 inches apart, pegging of cut-brush barriers in similar contour trenches, and the application of a coat of hot road oil on the smooth slope. Heavy rains fell upon the area immediately after completion but reports of their effect have not yet been received.

Forest Influences

Tank Experimentation at Berkeley

Runs on the five soil erosion tanks set at uniform gradients are completed. Preparations are under way to remove the 300 cubic feet of Aiken soil from the tanks and to refill with an equal amount of the sample which was collected on the California Forest, and is derived from serpentine rocks, representing an immature stage of soil weathering. Data from 8 series of 5 runs each are being worked up by Sundling and Lowdermilk.

A series of soil analyses have been completed by Sundling. The Station is fortunate to receive the generous cooperation in use of space and equipment in a modern soil laboratory, accorded us by Professor C. F. Shaw, Head of Division of Soil Technology, and Professors W. W. Weir and C. B. Bodman of the University of California.

North Fork Surficial Run-off and Erosion Installation

Records of the first effective storm of this season from North Fork show that more surficial run-off came from the pair of plots which were burned in the fall of 1929 than from the pair which was burned in the fall of 1930. This occurred even though a light covering of volunteer vegetation had come in on the first pair of plots. No run-off occurred from the pair of covered plots.

The Oakdale Conference

Lowdermilk was called to attend a meeting at Oakdale called by 5 Irrigation Districts in the San Joaquin Valley to consider the possible influence of the cutting of timber in the Sierra Nevada Mountains on the water supply for these districts. The irrigationists are primarily concerned with the yield of water from the forest covered hinterland. The yield of timber products is entirely a secondary consideration. The question has been raised whether the cutting of forests on the National Forests and on private lands is adversely affecting the water supply. It is not a question of flood control or of river stages so much as it is of the total yield of beneficial water. The question presents a very fascinating problem which requires an answer. It is a question that can not be answered by analogy, but will require specific studies designed for the purpose.

While it was shown that the cutting on National Forest lands was only incidental to the extensive cutting on private lands the aspect of the problem was not materially changed.

"There is no sutstitute for water".

Devil Canyon Center of Work

Conditioning of instruments and examination of sites for an experiment to measure the transpiration losses by canyon bottom vegetation were done by Lowdermilk in the first third of the month.

An invitation from the Section of Sanitary Engineers of the American Society of Civil Engineers was accepted by Lowdermilk to discuss our results on the effect of silt in water in its percolation into the ground, as it might affect the spreading and sinking of rectified sewage water. The critical nature of the water supply in southern California is requiring the rectification of sewage waters and their return to underground basins for reuse. About 50 per cent of the water used reappears in sewage waters. The problem is to return the rectified waters to the upper parts of the underground basin areas that sinking into underground may be effected before the escape of the water to the sea.

"When there is not enough water for everybody, there is not enough water for anybody".

Cover Types

With the end of November the mapping of the largest National Forest in California, the Santa Barbara, with a net area of 1,772,555 acres was practically completed. About 5 townships remain which cannot be typed until a topographic quadrangle is issued by the U. S. Geological Survey during 1931. Pack stock was necessary to work a large part of the Forest, which because of inaccessibility and ruggedness of topography

was unquestionably the most difficult area yet covered. This makes the third southern California Forest to be completed, the first being the Angeles, mapped in 1927-28, and the second the San Bernardino, mapped in 1929. The fourth and last National Forest in southern California, the Cleveland, is scheduled to be mapped during the period January to June, 1931.

Products

Woods and Mill Study

One of the cardinal rules in the planning and execution of all tree-to-green chain lumbering studies so far conducted by the Forest Service has been that the mill study shall be tied directly to the trees by marking the logs in the woods and thus maintaining their individual identity when run through the mill, both as to tree number and position in the tree. The exact yield by lumber grades for the original trees classified by the woods crews can then be determined simply by summing up the green chain tally recorded under the original woods numbers. The plan works beautifully under certain operating conditions but the conditions prevailing in the Pickering Lumber Company study conducted by the Station last year were so far from conforming to the requirements which are necessary to guarantee the efficient functioning of the direct tie plan that the cost of conducting the project was at least twice as much as it would have been without such synchronization, to say nothing of the difficulties of administration and the unavoidable losses of logs between stump and mill dock and in the mill itself.

There are many reasons back of these difficulties. The important point to be discussed is whether or not such grief can be avoided in future woodsmill studies by eliminating the physical tie between the two. Brundage has formulated plans for conducting logging and milling studies independently of each other and 'tying' the two together by means of a more intensive method of classifying logs than the grading system now used in appraisals.

The workability of the plan hinges on the results of special analyses of Pickering study data which have just been started. We are a long way from the final answer but the limited amount of work accomplished to date indicates that there are possibilities of describing logs with sufficient detail to allocate them to realization-value groups (yields by grades of lumber) well within the limits of accuracy needed for this type of study. Perhaps the log description need not go beyond the notation of "smooth", "medium", or "rough" in addition to the log grade designation 1(clear), 2 (shop), 3 (high grade, i.e., small knotted, common), and 4 (low grade common). Only a few small diameters have been worked out so far. In the larger sizes possibly the common log descriptions should be further supplemented by brief notes as to size (small, medium, large) and frequently (few, many) of knots. All of these items were recorded in the Pickering study expressly for the purpose of making this correlation. If well defined curves are

established for all diameters, our next studies will yield more and better data per dollar.

Lumber Depreciation

Brundage completed the first draft of the report on white fir degrade for publication in the Timberman, but it came back from the first two reviewers for overhauling. The charts and tables were satisfactory but the supporting text was considered too long, hence there will have to be a boiling down process which will delay publication for another month.

Entomology

The entire month has been spent in working up data and completing reports on the past seasons work. The transfer of Person to the Forest Service becomes effective December 1 and it was necessary to bring to a close the work which he has been following under the direction of the Bureau of Entomology. Mr. Bacon assisted Person until November 10 when his appointment was terminated. He will return to the University of California in January to complete his course in forestry.

Reports on biological control, experimental marking for insect control and on insect studies in connection with Sugar Hill fire were completed by Person. On the basis of the biological control studies a new method of control for the summer broods of the western pine beetle is proposed. The treatment with this method consists in falling the infested trees in exposed situations and trimming the limbs so as to leave the trunk exposed to direct sunlight. High temperatures, unfavorable moisture conditions and the concentration of the predators are depended upon to reduce the western pine beetle broods without injury to the predators. Although the D. brevicomis broods are reduced only 40 or 50 per cent by this method the protection of the predators should more than compensate for this shortcoming. The method would be limited to areas with open stands and moderately level topography where the need for maintenance control made work on the summer generation desirable.

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CENTRAL STATES FOREST EXPERIMENT STATION

General

Preparations for the Central States Forestry Congress to be held December 3, 4, and 5, 1930 at Indianapolis required considerable attention on the part of the Station staff. In addition to individual

papers, various press releases were prepared and distributed. Over one hundred programs were mailed to interested parties in the region. Papers written for presentation at the Forestry Congress were as follows: "The Central Hardwood Forest - A Research Task" - E. F. Mc Carthy: "What Species Shall We Plant?" - L. F. Kellogg: "Protection from Grazing is Essential to the Welfare of the Farm Woods of the Central States" - R. K. Day.

The Station, since its establishment, has pursued a policy of cooperation with other research agencies in the region - a policy which will be carried as far as the Station funds will permit, for the solution of the numerous forestry problems. An agreement was recently completed for correlation of forest research efforts of this Station and the Purdue Agricultural Experiment Station.

The Station bibliography was brought up to date by Kellogg. This bibliography lists all material relating to forestry that has been published by agencies within the territory of the Station.

Woodland Grazing Study (Fg-1)

During November Day prepared a working plan for a cooperative study with the Purdue Agricultural Experiment Station of the grazing capacity of the farm woods. The work will be done on one of the experiment station farms which is very favorably situated for such a study. A comparison will be made of the gains in weight made by cattle grazed in the woods and open pasture. Quadrats established in the grazed areas will show the effects of grazing on tree reproduction and other vegetation. Work will be initiated as soon as the plan is approved.

Plantation Study (Fp-1)

A map record of the location of forest plantations in the state of Illinois was completed by Kellogg and a similar record begun for Iowa. These maps on a scale of 2 miles to the inch not only indicate the location of plantations, but in addition show the locations of the original timbered areas as taken from the early survey notes. Wherever it was possible to do so, the present boundary lines of the native forest were also drawn in.

The walnut volume alinement charts were completed and returned to us by the Office of Forest Measurements, Washington. These charts show the volumes of plantation grown trees by total pooled cubic volume, merchantable cubic volume with bark and board feet by the International log rule with 1/8 inch saw kerf.

Litter Study (M-1)

The past month Auten has been equipping a laboratory preparatory to making tests on virgin forest soils, samples of which were collected during the past field season. Laboratory space and other valuable cooperation has been furnished by the Chemistry Department of the Ohio State University.

The analysis of the apparent specific gravity tests of virgin forest and cultivated soils was completed. On the basis of this work Auten has prepared a short article for publication.

The final analysis of the data comparing the pore space in virgin forest and cultivated soils is presented in the following table. Each area represents an average of twenty samples.

Area No.	Excess % of Pore Space Woods over Field	Area No.	Excess % of Pore Space Woods over Field
1	19.95	10	17.31
2	19.23	11	12.99
3	8.11	12	2.60
4	8.27	13	25.33
5	13.44	14	25.65
6	16.45	15	23.21
7	8.84	16	34.67
8	17.57	17	13.35
9	15.46	18	6.06

Average - 16.02

Oak Yield Study (Ts-12)

Early in November, Barrett spent several days at Henryville, Indiana completing a forest type map of the 169 acre mill tract on which a study of growth in the all-aged forest of mixed species is being made. The forest type classification approved by the Ohio Valley Section of the Society of American Foresters at their October, 1930 meeting was adhered to as far as possible. However, it was necessary to recognize one type not included in the classification of the Society. This was the white oak - black oak type which was found to rank third in order of area covered. Six types in all were present on the tract.

Barrett began work on the text of an establishment report outlining the procedure followed in making the Henryville studies.

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INTERMOUNTAIN FOREST AND RANGE EXPERIMENT STATION

General

The Intermountain Forest and Range Experiment Station moved into its new quarters in the Hotel Bigelow on October 31. We now have some of the best office quarters in the city, located in the community center.

Influences

A total of six geologists have been called into a consultation on the study of the 1930 floods in Utah. This was found necessary because the second geologist called in did not agree with the first on the interpretation of the geological formations on the areas involved. This consultation has been well worth while since it has resulted in bringing out the many angles involved, and it will be possible to feel more secure in the conclusions.

Forsling, in company with Regional Forester R. H. Rutledge and Assoc. Biologist Locke, made a trip into the back country on the Middle Fork of the Salmon River in Idaho during October. This is in country having rough topography and granitic soils similar to those in the Boise region. Part of the area was burned over by very hot fires in 1929. A considerable downhill movement of the soil on steep slopes has occurred on the burns. The fire consumed practically all of the undergrowth and litter, which has released the soil. The soil movement has been accelerated by fairly heavy rains during the summer of 1930, but in places the slopes are so steep that gravitational creep in the absence of precipitation is prominent. Similar areas, burned over years ago, have practically no reproduction and it is assumed that the disturbance of the soil following fire is a big factor in the lack of reforestation. It will be a very long time before the stand of Douglas fir and lodgepole is replaced wherever the soil has started to move.

The territory examined as a whole has had only moderate grazing on it since 1920. Prior to the Thunder Mountain addition in 1920 in which much of the area is included, there was very heavy grazing on some parts. Recovery has been slow on these places and on some of them the torrential rains of 1930 caused very heavy floods and erosion. Portions within the flood areas such as north slopes showed no signs of floods or erosion where the grass cover remained intact, while opposite faces where bluebunch wheatgrass and other species had been depleted suffered very heavy erosion. It was noted also that downy brome (Bromus tectorum) offered only partial protection to erosion as compared to the intact cover of Idaho fescue and Sandberg's bluegrass on the north slopes.

Biological Studies

Messrs. Rutledge, Forsling, and Locke of the Biological Survey made the trip to the Middle Fork of the Salmon River primarily for the purpose of outlining a game study on the Middle Fork winter range. This is an area where large numbers of deer from surrounding territory congregate during the winter. Conditions are now such that in places the range is being overgrazed by deer. It offers an excellent opportunity for outlining a research project which will help solve a pressing administrative problem, and afford other information of scientific value. The study will be carried on by Ranger Arthur Buckingham, who received his B. S. degree at the University of Idaho last year.

Forest Management

Watts is busy at present digging through the old SI files segregating the material which has present or future value in building up a program for this region. Names encountered in this task, Sparhawk, Fetherof, McLean, Hodson, Baker, Korstian, Bower, Brower and others, call up early days in Silvical Research in the region.

Fire Studies

The Regional Office has detailed Clayton Scribner to the Station for the winter season and will assign one more junior forester on January 1 primarily for the purpose of analyzing the fire statistics for the eight so-called fire forests. The procedure being worked out by the Research Fire Committee will be followed in abstracting and coding but it probably will not be able to make a full analysis of the coded material at this time.

Snow Dispersal

A series of five permanent one-acre plots have been selected and established near Payette Lake, Idaho, to study the effect of cover on the dispersal of snow. It was possible to select a very good series of areas on which all factors except cover are practically identical. All of the plots are within a quarter section on which the difference in elevation will not exceed 25 feet. The following cover conditions are represented: (1) mature western yellow pine with no understory, (66,528 B.F. per A.); (2) mature western yellow pine with a heavy understory of advance reproduction, (66,568 B.F. per A); (3) a heavy stocking of 30-year-old reproduction on a cut-over area, (4) sagebrush cover with no timber; (5) practically bare land on an area once cleared for a polo field.

Two additional plots, one in a poorly stocked cut-over area and one in ceanothus, may be selected during the intensive study to be started next spring.

Detailed cover and crown maps were made of each plot. A half-mile permanent snow survey course (25 stations) has been laid out upon which complete snow measurements will be made semi-monthly all winter. Air temperature and precipitation will be recorded at a cooperative Weather Bureau station 1½ miles from the plots. A complete inventory of the snow cover will be made at the end of winter. During the period of melting of the snow in the spring detailed daily observations will be made of the march of snow recession to be followed by soil moisture determinations at 10-day intervals until about July 1.

Great Basin Branch

Field work at the Great Basin Branch Station was completed on October 31 and the Station closed for the winter. The field work during August, September and the first half of October was pretty much handicapped by bad weather. A period of good weather from the middle of October to the end of the month was used to good advantage to complete as much field work as was possible, including completion of the charting of the plant vigor quadrats, measurement of growth and utilization of forage species on selected representative areas, selection and sowing of artificial reseeding plots on three fenced areas in the oak zone and the examination of plantings made early in the summer. Nelson and Watkins closed the station on October 31 and moved back to headquarters at Ogden.

L. W. Kephart, Senior Agronomist, Bureau of Plant Industry, spent October 1 and 2 at the station going over the artificial reseeding tests with sweet clovers in which his Bureau is cooperating with the Forest Service. It was not possible to make any field examinations of the 1928 and 1929 sowings because of a snow that fell during the night of October 1.

Spring-fall Range

Dr, Stewart and Mr. Pickford spent the early part of October in central Utah obtaining data in questionnaire form relative to the year around range situation and grazing operations of sheep owners in the Fountain Green woolgrowers association. Twenty-six sheepmen were interviewed and data were gathered on a total of 93,850 sheep. This information furnished a good cross-section of the yearlong range practices in this locality.

Some of the interesting summaries from these questionnaries follow: The average trail from summer to winter range is 198 miles. Sixty-five days are spent on the trail each year, sixty days of which are spent trailing to and from the winter range. The time of trailing

back to the spring is 13 days longer than the time taken to go out to the desert in the fall due principally to the weakened condition of the sheep after the winter grazing period. An average of 150 days are spent each year on the winter range. Forty-seven days are spent on the spring lambing range, 91 days on summer range and 11 days on fall range. Due to the scarcity of true spring and fall range in this locality a great deal of the feed for these periods is taken on the trail to and from the desert. Twenty-one of the sheepmen interviewed use Forest Service lands for all or part of their summer grazing. The remainder summer on private or leased ground. All of the sheepmen interviewed use public domain lands for their winter grazing. Only three own or lease a portion of their winter range. All of the sheepmen interviewed use the West Desert in western Utah for their winter range. They have been intimately acquainted with it for an average of 30 years. Twenty-four of the 26 sheepmen admitted that the desert range has decreased in carrying capacity. Estimates on the amount of depletion ranged from 10% to 60%, averaging about 30%. Overgrazing, excessive trailing for water and grazing during the spring growing season were the chief reasons given for this depletion. Twenty-two of the sheep owners favored government control, only one was opposed to it, while three were non-committal.

Winter Range

Stewart and Pickford have recently returned from a trip of about 900 miles over the winter ranges on the West Desert. The purpose of this trip was to become acquainted with present conditions on this semi-desert range. Fortunately Messrs. Winkler and Standing of the Regional Office of Range Management were able to accompany them, Mr. Winkler, who has been acquainted with some of these winter ranges for thirty-five years, pointed out the location of watering places, changes in forage conditions, and modification in grazing practice. Observations made on the trip will constitute a basis for planning subsequent research.

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LAKE STATES FOREST EXPERIMENT STATION

November was the month during which the scattered members of our family drifted back to headquarters. Practically all the field work is now at a close. The Station is a regular beehive, with some 27 people dictating, computing, typewriting, and meditating.

The outstanding event of the month was the absence of the Director, who spent three weeks in the State of Washington as a star witness for the City of Seattle in its suit for damages done to the watershed. The

Director's heroic effort held the court spellbound (?) for 2½ hours, but in spite of (or because of) his expert testimony, it appears that the City will lose the case.

Stream samples were taken throughout the summer in Buffalo County, Wisconsin as a part of the work of the Station's erosion studies. The summer was one of the driest on record for this region. Analyses of the one thousand samples taken show that even during periods of prolonged drought the streams carry a very considerable amount of silt. Observations of the stream bed gives an explanation of its action. During spring floods a large amount of silt washes off the fields and collects in the stream bed. If this is followed by long periods of dry weather, the stream gradually cuts through the silty deposit to the underlying sand. The sand starts rolling and its abrasive action wears away the silt and places it in suspension whence it is carried away by the stream.

Last winter was particularly severe on seedlings in the nursery so gave an excellent opportunity to check up on the relative hardihood of Norway pine seedlings developed from specially collected lots of seed. These seeds were collected from various localities throughout the Lake States, especially from different latitudinal and different temperature zones. The relative hardiness of seedlings as revealed by nursery survival showed little correlation with temperature and latitudinal zones; in fact seed from trees growing side by side showed wide differences in the hardihood of their seedlings. The rather surprising result is that seedling hardihood seems to be in inverse proportion to the hardihood of the parent tree. Bates says his present conception of the ideal Norway pine seed tree is a tree of medium age which has a thin crown, stands more or less isolated on a sandy barren, and has lived through 3 or 4 fires. It may have a deep fire scar running well up the bole and have the lower limb burned off. Such a tree produced numerous cones, has a crop most every year, and the seed is well filled with a firm kernel. The seedlings developed from such seed are both stronger and more winter hardy than those from trees of high vegetative activity.

The Station has taken up a new phase of the study of dormancy of white pine seed. Cold temperature stratification gave very gratifying results last year as a pre-treatment of white pine seed. Dr. Lawrence Zeleny has been employed to investigate the chemical changes occurring in white pine seed during the pre-treatment process and subsequent germination. Each chemical analysis will be correlated with germination tests on the same lot of seed. The work is being carried out in cooperation with the Division of Biochemistry of the University of Minnesota and is under the direct supervision of Bates and Dr. Gortner. At present very little is known of the chemistry of pine seed except that the stored material is in the form of oils, galactans, and manans, rather than starches and sugars. This study should open a fertile field for subsequent chemical investigations as well as yield important information of practical methods of handling white pine seed.

Kittredge and Roe spent the summer in a study of the forest types found on various soil types. In northern Minnesota, they found a very definite correlation between soil type and forest type; in fact by looking at the soil map they could predict quite accurately the type of forest they would find. On areas covered with well-stocked stands of jack pine or aspen, site determinations were made, the soil profile was described, and the vegetation on a milacre quadrat listed according to its abundance. In northern Michigan, the correlation between soil type and forest type was less distinct. Rubicon sand, which is characterized by a hardpan at varying depths, was found to support stands of jack pine, aspen, white pine, and hardwoods. As the area was covered by a survey in 1915, which did not recognize as fine distinctions as was done in later surveys, this may account for some of the lack of correlation.

The investigation of the fire menace of slash in Wisconsin carried out in cooperation with the University of Wisconsin and the Wisconsin Conservation Commission revealed that about one-half million acres of land in Wisconsin are at present covered with slash, mostly of hardwoods but mixed with hemlock and balsam. This slash presents a particularly bad fire menace for eight years after logging. The consensus of opinion of numerous loggers, rangers, and other woods operators, was that the slash should not be burned in wholesale fashion. The findings will be placed before a committee of lumbermen and the Conservation Commission before the report is submitted to the State. It appears, however, that better fire protection for areas covered by slash will prove more practical than a general slash-disposal law. It is felt that the cost of added protection for slash areas should be borne by a special tax on the land in question.

The Fire Station at Roscommon, Michigan was established during the summer. This Station is located in cut-over oak and jack pine lands which have been subjected to repeated fires.

The Michigan Department of Conservation is cooperating with the Lake States Forest Experiment Station in developing this Station for research work on forest fires and forest fire suppression. Most of the early summer was taken up with completing the buildings and organizing the area. Mr. G. I. Stewart of the Michigan Department of Conservation is in charge of the Station. Stewart is making a study of the use of various chemicals in fire-line construction. He also had several types of fire suppression equipment to try out, but due to the bad fire season in Michigan most of this was in use on going fires so there was little chance for comparative tests. Mitchell and Neetzel laid out a number of sample plots where different methods of slash disposal are being tried. Each plot is about 1½ acres in area and is surrounded by fire lines. Lopping, piling, and burning, broadcast burning, swamper burning, piling and leaving and allowing slash to remain where it falls are being tried to determine relative costs, relative effectiveness, and the possible effects on the soil and vegetative cover. Burning is

to be carried out at various periods throughout the year to determine the tendency of fire to run and how effectively it eliminates the slash menace. One of the gratifying features of this work is the interest shown by the public. Over 150 visitors came out to the Station during the course of the summer. As the Station is not on the highway, and there is no sign up, it speaks well of the interest of the people of Michigan in forest fire investigations.

The strip survey of cut-over lands in northern Wisconsin revealed that existing volume tables prepared for timber growing in well-stocked stands were not applicable. The cut-over lands have open stands with relatively short limby boles. New volume tables and yield tables for this land are being prepared. It is expected that a final report on the work will be completed before next May.

Preliminary analyses of data obtained from the Chippewa National Forest this summer yield two noteworthy observations. Quadrats on which the surface leaves were burned with a torch produced more and taller aspen root suckers than adjacent unburned quadrats. This stimulating effect of burning seems to be due to the greater heat-absorbing capacity of the blackened surface.

Observations on the drought injury of plants were made on four jack pine cutting plots. The most severe injury occurred on the plot which had the heaviest cutting and the least injury was found on the uncut plot. This seems somewhat at variance with the opinions of those who hold that root competition of the overwood is responsible for most of the failures of reproduction under canopies.

Norway pine appeared to be most drought resistant of all conifers growing on the plots followed in turn by jack pine, white spruce and white pine. Tamarack was least resistant. The observation that Norway pine is more drought resistant than jack pine, and that late flowering aster is more drought resistant than blueberry indicate that the growth requirements of a plant cannot be accurately predicted by observations on the habitat in which it grows.

Paul Rudolph was transferred from the Southern Station and plans to work with Bates during the winter. He is particularly interested in the proposed experimental plantings in North Dakota and will probably be assigned to that work if the project goes through.

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NORTHEASTERN FOREST EXPERIMENT STATION

Westveld made a trip to Cherry Mountain and put in a new series of seed spots on his methods of cutting plots there. A number of spots have been sowed each year since 1926 to study the germination and survival of spruce and fir under a variety of seed bed conditions. West-

veld has been working over some material on the adequacy of various methods of sampling reproduction as the basis for an article in the Journal of Forestry.

Behre and Westveld spent two days investigating possible locations for "Natural Areas" on the White Mountain National Forest. The most satisfactory area which has been found to date embraces the west side of a high, steep valley known as the "Bowl" on the east side of Mount Whiteface. This area is reached by a three mile walk from the end of the automobile road at Wonalancet at the southern boundary of the Forest. The stand ranges from pure northern hardwoods or spruce and hardwoods at the bottom of the valley to pure spruce farther up the slopes. The range of altitude in the timber types is from about 2,000 feet to 3,300 feet, with the summit at Mount Whiteface going up to 4,000 feet. There are no operations on this side of the Forest at the present time, and the sentiment of the influential group of people who use this area for recreational purposes will probably prevent any exploitation in the future. The total area involved is at least 1,000 acres but suitable areas of smaller size could be blocked out if desired.

Behre attended a meeting sponsored by the Massachusetts Forestry Association to consider the needs for a topographic re-survey and land economic survey for the State. This meeting was well attended by representatives of many groups interested in the land problem. As a result of the conference a permanent organization was set up to work for a land economic survey which will include an aerial photograph and topographic re-survey as its base.

Attendance at the recent meeting of the New York State Economic Council at Utica and the Sixth New England Conference at Boston emphasized the extreme interest of the public in recreational use of the forests. Forestry had no place in the program of the New England Conference but community development, regional plans, and highway beautification received much emphasis.

MacAloney has been working on a number of manuscripts for publication. A paper on "The Legitimacy of Pissodes approximatus" has been submitted for approval. There has been some discussion among entomologists as to whether P. approximatus is distinct from P. strobi, the white pine weevil. MacAloney is satisfied that the two species are distinct. Another paper discussing the improvement of severely weevilled white pine plantations is being prepared in cooperation with A. C. Cline of the Harvard Forest.

Spaulding and MacAloney have started the compilation of material gathered during the past summer on the deterioration of birch following cutting.

Miller has spent most of his time on work of routine character in his efforts to become more familiar with the fauna of the white pine types.

A conference was held with representatives of the Harvard Forest to lay plans for studying the red squirrel in relation to damage to plantations and insectivorous birds in these plantations. Work on this study will be initiated at once and will be continued throughout 1931.

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NORTHERN ROCKY MOUNTAIN FOREST EXPERIMENT STATION

Announcements were sent out late in November, by Major Kelley, calling the 1931 Investigative Council Meeting to be held in Spokane January 9 and 10. Invitations were sent to 14 addresses outside the Forest Service, including two Canadian forest agencies, one of which was represented at our meeting last year.

The annual job of coding the R-1 lightning data has been commenced by Forest Ranger H. R. Richards who has been detailed by Operation to assist in this and the statistical study of the fire records during the winter. It is hoped that the analysis of the 1929 lightning data which have been machine tabulated may be completed by Richards and Gisborne before the statistical study demands their full time. Due to the agreement reached last spring with Regions 2, 3 and 4 and with the Nelson District of British Columbia, this Experiment Station is now relieved of the labor of coding some of these lightning storm reports which were previously handled here. It is still planned to make the analysis of the tabulated data for all of these Regions, but so long as some of them obtain so few lightning storm reports in any one year, that work can be postponed until a worthwhile quantity of data has accumulated. With the new lightning storm report form now in use it will be necessary this year to prepare new instructions for the sorting and tabulating of the punch cards in order to develop all of the information on the new form. Unfortunately, it has been found that some of the old forms are still being used by some lookouts and this is very apt to reduce the quality of the summaries.

Due to the interference of the holiday season, and to the fact that many forests cannot spare their deputy supervisors until after January 1, the work of coding the fire reports, as the first step in the statistical study, has been postponed until after New Year. Men have been selected, however, and plans completed for commencing this work immediately thereafter. Progress on the data for the Kaniksu, Coeur d'Alene, St. Joe, Clearwater group of forests will be pushed in order to obtain results as soon as possible for this region which has been selected as the starting point for the transportation study.

Haig spent most of the month on methods of cutting and reproduction studies chiefly in completing establishments reports and systematizing records. As one result any one can now take over the

work on these projects and obtain a clear conception of what has been and what must be done to carry out the original intentions of these experiments. Each plot will later be given a series of promise cards to show the time and type of both annual and periodic examinations. It is planned later to extend this promise card system to all permanent plots. The details of examinations vary too frequently from plot to plot and season to season to permit a project leader to carry the plans in his head with proper assurance that they will be attended to at the proper time.

During the past summer Haig made, incidental to routine examinations a preliminary study of seasonal germination of reproduction to obtain a check on the accuracy of our single examinations and to determine the best time of year to make them. Spring and fall examinations during the preceding summer had shown that single examinations in the fall, at least on dry sites in a season marked by high mortality, would fail to record a great many seedlings which germinated in spring and early summer and died during the summer drought long before the fall examinations. Early spring examinations, on the other hand, obviously might be made too early and thereby fail to account for all of the germination. The study during 1930 consisted of examining at two week intervals a series of quadrats on a north protected aspect where germination would be very slow to start and mortality relatively low. These periodic counts show that on such aspects a single spring examination was even more misleading than a late fall examination, for germination on this plot was only 40 per cent complete on June 9 and not satisfactorily complete until about July 21. Consequently any examination on this plot should be made between July 15 and September 15 in order to obtain figures of about equal accuracy. It seems desirable, therefore, if our single examinations are to give accurate results, to make them between July 1 and August 7. Plots on hot, dry aspects, of course, should be examined first and plots on cold, moist aspects last. The exact time of examination will need to vary somewhat with the character of the season. During 1931 the studies of time-of-germination will be conducted on an enlarged scale over several types of aspects to give us more of this greatly needed information on such matters.

Temporary Assistant Fisher spent the first two weeks of November at the Priest River Branch sorting out seed stored in the duff in our natural storage experiments. The germination tests on these seed will be made during the coming winter at Savenac Nursery through the courtesy of the Regional Office of Planting.

Fisher spent the last two weeks of November compiling records on permanent method of reproduction plots. It was previously estimated that six weeks' work would complete this phase of the compilations. Present indications, however, are that eighteen weeks will be closer to the fact. This is probably a good indication that Rube Goldberg's old rule of "Multiply by two and you're nearer right" has no better application than in making time estimates for office compilations.

Thompson reports, from the Priest River Station, an observation that may be of value in estimating the winter's snow breakage, hence later necessity of exceptional labor in clearing trails. He states that the snows of this month came with falling temperatures which changed rain to sleet and then to snow. As a result a large number of the smaller saplings are bent over to such an extent that unless thaws occur soon there will be a heavy loss due to snow breakage. The situation is aggravated by the fact that larch needles had only partly fallen, before the sleet, and those still on the twigs are now frozen solidly forming a compact mass on which later snows are more apt to lodge, and add weight.

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PACIFIC NORTHWEST FOREST EXPERIMENT STATION

General

An important event of the month to us is the publication of the long heralded bulletin by McArdle and Meyer on the "Yield of Douglas Fir in the Pacific Northwest". The clerical force has addressed over 2000 envelopes for local distribution beside a larger number of announcement slips. The authors have prepared a series of news releases and circular letters to be enclosed with the bulletin to fit each type of recipient, so that we feel that this important publication is being put conspicuously before the clientele most likely to use it.

Munger made two trips to Salem in the interests of the Forest Survey, one to confer with various state officials on the new base map toward which they are contributing, and the other to appear before the State Board of Forestry asking for a special appropriation by the State for cooperation on the Forest Survey.

Munger has been in touch with the local architects who are designing the new federal office building in which the Station has ample space allocated. It is still too early to plan the details of the interior, though the arrangements of other stations with new quarters have been studied.

As a measure of cooperation toward the Portland Municipal Arboretum, the Station gave technical aid to the Portland Park Bureau by preparing a list of the conifers likely to survive in this locality. The names adopted for the indigenous species are based on the Forest Service Check List, those for the exotics on Dallimore and Jackson's "Handbook of Coniferae". This compilation includes 205 species in 32 genera. In number the pines rank first with 53 species, the balsam firs have 29, the spruces 24, the junipers 20, and the larches are represented by 11 species.

Methods of Cutting Western Yellow Pine

Kolbe spent the greater part of his time this past month in organizing the field and office records for this project. The reproduction records for 1930 have been summarized on office forms along with other field data. The office work on this project has been behind the field work for the last few years; hence every effort will be made the coming months to get it all up to date.

Natural Reproduction of Douglas Fir

Early in November Isaac visited the seed dissemination study area at Wilark, Oregon and collected the seed from the traps. It was a matter of surprise to find a comparatively light seed fall as earlier in the season there was every evidence of a heavy crop. An inspection revealed that the cones on the virgin timber had not matured properly for some unknown reason. Young growth in the vicinity bore a heavy crop of well developed cones. A seed trap within 50 feet of 10-inch understory western red cedar that was left after logging, indicated a fall to date of more than 3 million cedar seed to the acre. It will be interesting to note how much reproduction will spring from this seeding and may indicate that understory cedar and hemlock left by the logging operation are an important source of seed for logged-off lands.

Compilation of the year's findings on the reproduction plots is under way and indicates that 1930 was the most severe season since the study started in 1924. On the areas where physical factors are being measured, frost and rodent damage was added this season as new causes of loss, and on some plots all seedlings were lost. The average survival of 1930 seedlings on this group of plots on a site that is only moderately severe was 5.3 per cent.

Douglas Fir Slash Disposal

Three plots near Portland, burned over during the month, were remeasured by McArdle. A very large amount of computational work has been done, preparatory to writing a progress report on this study.

Fire Studies

Lightning storm study - Lightning storm reports for the past season are practically all in and are ready for punched card coding.

Fire report analysis - About half of McArdle's time during November was devoted to preliminary work in connection with the proposed analyses of R-6 fire reports, especially the analyses dealing with hour control objectives. Several lengthy conferences were had with members of the Office of Fire Control. It was finally decided to postpone any attempt to transcribe to punched cards the complete fire report data of the Region until some preliminary work was done with a smaller amount of data.

Central Dispatcher A. G. Angell of the Whitman accordingly was asked to bring to Portland the fire reports for his forests; McArdle and Angell have since been "in seclusion", turning out tables and charts by the dozens. Definite decision as to the actual technique and the specific items to be taken from the fire reports awaits the outcome of this preliminary work.

Mensuration

Routine computation in the western yellow pine study has engaged the attention of Meyer and his two assistants for most of the month.

A little time was spent by Meyer in evaluating the efficacy of the check cruises which are being made by the Forest Survey and in analyzing the value of one-run and two-run cruises. In the mature Douglas fir types, tentative calculations reveal that after 320 acres have been surveyed in both one-run and two-run cruises by the circular plot method, almost the full variety of conditions has been experienced, as expressed by the standard deviation. This means, in turn, that further increase in size of the surveyed area tends directly to reduce the error of estimate according to the statistical law (i.e., inverse proportion to the square root of the size of the area). Thus two men running through a string of forties, one on each side, would have about the same variety of conditions after 8 forties were run through and their independent estimate of the total stand would have the same degree of error. The combined estimate of the two would have an error of $1/\sqrt{2}$ times that of either. This does not mean, however, that the estimates are exactly the same. Such a condition can be expected only after a much larger area has been surveyed. Tentative indications based upon the limited amount of material available are that in order for an estimator to get within a 5 per cent maximum error from the average, a total area of 88 forties at the most would have to be covered on the basis of a one-run cruise or 5 per cent average. To get within 3 per cent maximum error the area would have to be 224 forties at the most. By happenstance, of course, the desired accuracy might be attained in a much smaller unit, as actually happened in some sections of the data.

Wind River

Simson closed up the station and came to Portland the fourth of the month. At Thanksgiving time he returned to Wind River in order to mulch some of the more tender seedling species growing in the arboretum nursery.

Since coming to Portland, Simson has been occupied largely in organizing the winter's work and preparing outlines for weather and fuel reports.

Forest Insurance

Shepard devoted the whole month to office work with the exception of one day spent at Longview where he had an interesting conference with J. B. Woods.

Primarily the month's effort was the development, classification, and study of the material gathered in the field during September and October with particular reference to its sufficiency or non-sufficiency and the determination of what supplemental field work is needed and how it can best be accomplished. There has also been the consideration, in this study, of how the technique of integration of this work and the other phases of the study will best be developed and applied.

Considerable time has been devoted to consideration of the plan of approach to the statistical analysis of the fire records, including a complete listing of the items desired, together with a tentative conclusion as to how to conduct the work. Undoubtedly one county will be tried out first in the very near future by the method now believed best adapted in an attempt to show up weaknesses in the plan before undertaking the job in its entirety.

It is clearly evident that the field work has yielded some extremely pertinent material bearing on fire losses in both merchantable timber stands and stands of young growth of various ages. In some cases the direct effects of known elements of relative hazard are clearly evident. In other cases the results indicate influences on fire behavior that probably do not admit of easy classification. It is our opinion that here is one of the major elements of value of the field work. It will help us to distinguish between those elements of hazard which can reasonably be factored out and those which must always be left as unknowns that can probably never be applied except as general averages. The factors contributing to the development of whirlwinds which, in turn, contribute to the development of destructive crown fires, are a case in this latter point. Whirlwinds may or may not develop and we can, probably, only average up the general proportion of crown burn and apply it as an average probability in all properties in any given type or region.

Forest Survey

Status of Field Work

Field work for all private lands in Benton, Polk, and Yamhill counties has been completed this month. Work is now under way in Cowlitz, Linn, Lewis and Marion counties; the last named county will be completed within a week, the others some time in January depending upon weather conditions.

Results of Check Cruises

Several private and two county cruises have been checked by Girard, Pratt, and Kline with very satisfactory results. One county

cruise covering the entire timbered area of the county was found to be consistently low, by 20 per cent. Satisfactory correction factors have been determined for the several species found in this county and will be applied to the county cruise. A field check of one large private cruise made by Girard and Kline showed that Douglas fir comprising over 90 per cent of the stand was 2½ per cent lower than the Survey estimates, cedar -the next most important species showed less than ½ of 1 per cent difference, the other species showed greater differences but the volume involved was relatively small. Check cruising is under way in Clatsop and Lewis counties, both of which will be completed shortly. Girard has been able to verify our results in the two counties completed by making a comparison of the cutting records and utilization practice of two large private operators with the cruises in these counties, both cases giving the same results as did our field check within a range of 1 or 2 per cent.

Forest Survey Personnel

We were sorry to see C. M. Granger, National Director of the Forest Survey, leave Portland for Washington, D. C. on November 15, after eight months in this office.

William J. Wakeman, graduate of Oregon State College, with some years' experience as a cruiser and logging engineer has accepted appointment as a timber expert and took up his duties November 24.

G. H. Lentz of the Southern Experiment Station arrived December 1, to spend a couple of weeks studying Forest Survey methods in this region.

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SOUTHERN FOREST EXPERIMENT STATION

General

On November 7 at the Urania branch station a field meeting of the Southern Forest Research Advisory Council was attended by about 100 interested lumbermen, timber land owners, and foresters. Trips were taken to numerous permanent sample plots on the lands of the Urania Lumber Company. Twenty-eight cars carried the visitors through about 32 miles of splendid second growth that has resulted from fire protection during the past quarter century. Stops were made in the forest at places where studies of fire damage, thinning, natural reproduction, and methods of cutting are in progress. At each point Denmon spoke briefly of the results attained. Visitors were provided with a field guide leaflet giving these results in more detail.

Among the oldest experimental forest plots in the South are the Roberts Plots on an area where longleaf pine seedlings came in naturally in 1913. Trees 20 feet high on protected soil stand adjacent to others only 9 feet tall on the annually burned check plot. At this point Hon. Henry E. Hardtner addressed the gathering, explaining how doubtful he was of the success of reforestation twenty-five years ago when the experiments were undertaken. He referred to the failure of his early cuttings in longleaf pine to support the axiom that "Like begets like" even under fire protection, and his later enlightening discovery of the damage done by hogs. He said that he considers his work in reforestation on this 100,000 acre tract, now attracting such widespread attention, as the greatest achievement of his life.

The Urania Lumber Company was host at a barbecue at the Yale Camp. There Mr. Bens gave a demonstration of tree felling with his portable power saw.

On November 8, Mr. Hardtner presided at the Seventh Meeting of the Advisory Council at Alexandria, La. Director Demmon's report and program was approved. The methods of study followed were considered appropriate to the solution of the problems attacked, and adequate to the extent of resources available at present.

Discussion brought out the need for developing the hardwood studies as rapidly as possible and for early publication of results in pine. Additional fire plots to be burned at intervals of about 5 years were recommended for the shortleaf region.

In the afternoon a trip was taken to the Catahoula purchase unit, where Supervisor Plymale showed the visitors a new fire tower, fire lines made with tractor and grader, and large areas of thrifty young longleaf pine.

Possible experimental forests received some attention at two points. The Starke branch examined certain lands of the Atlantic Coast Line Railroad near Waycross, Georgia, to judge their suitability for our purposes. Wahlenberg completed a report on the valuation survey near McNeill, Miss. This covered 1500 acres in all, including a section of leased land on which our grazing and burning experiment is now in progress. Appraisal and steps toward purchase will be handled by Mr. Ashe.

Junior Forester C. F. Olson joined the Station staff. He will replace Paul Rudolf, who was transferred at his own request to the . Lake Station on December 1, having been with us since July 1929. Olson received his master's degree at Cornell last spring and has been working on a soil survey in New York during the past few months.

Lentz left for Portland on November 27th, where he will spend several weeks with the Northwestern Station and become acquainted with their method of conducting surveys in the Douglas fir region.

Demmon's time was largely devoted to conferences with Munns, other representatives of the Washington office, lumbermen, and foresters at the Urania branch station, and similar contacts at the Starke Branch. Demmon also visited the hardwood crew in the field at Opelousas, La., and found time to prepare an article on hardwoods for The Southern Lumberman.

Mr. Carl Williams of the Federal Farm Board visited the headquarters office and discussed the possibilities of using information from this Station in showing the value of marginal land in the South for forestry.

Economics

With the exception of two days Ziegler spent the entire month in the office (1) revising the Appling County report (2) putting the Washington County report in shape for printing (3) working on the Florida tax and County reports, and (4) revising the Beaufort County, North Carolina, report. On November 5-7 he reported on the economic studies at the Advisory Council Meeting in Alexandria, La., Bond, Spillers, and Reynolds assisted Ziegler with the compilation work.

Naval Stores

The Union tract experiments were closed out during the first part of the month and a large number of the trees were cut and height growth measurements made.

The last dip and scrape records were taken at Kingsley and Raiford. A remeasurement of diameter at 9 feet and at breast height was taken on all of the trees in tests which we are now closing out at Kingsley and Sampson. It was found that height remeasurements would not be significant and it was decided to get information on the effect of chipping methods on height growth by having the extensive survey crews cut a number of trees and make stem analyses later on in the winter.

Two thinning plots in young slash pine were established on the Raiford Prison Farm tract in cooperation with Coulter, Barnes and Preston of the Florida Forest Service and Dr. Cary.

A report on the dendrometer experiment was prepared covering the records taken up to the time of the annual meeting of the Advisory Council.

Type descriptions were completed and submitted to Professor Hawley. The report of the Committee on the Progress of Commercial Forestry was reviewed and returned to Professor Shirley Allen.

The new interval of chipping test was established in the field at Kingsley and is now ready for active work which will not start, however, until the Middle of January. At the same time a start was made in establishing the advance streak groups at Kingsley. It was found, however, that only three groups can be laid out rather than four, unless trees are taken for back-facing which are much too small to be used for this purpose. Raking was started at Kingsley and it is expected that the raking at Kingsley and Sampson will be completed early in December. A tracing was made of the specification for a canvas chipping paddle designed to exclude chips and trash from the aprons and cups at the time of chipping.

Forestation

Wakeley and Gross of the R-7 office of planting reviewed the progress of forestation experiments at Camp Pinchot with Gemmer. The experiments at Bogalusa and Woodworth, La. were also visited. From the State nursery they went on to the three Louisiana purchase units with Supervisor Plymale, making an estimate of future planting needs. Wakeley is devoting as much as possible of his office time to the forestation bulletin.

Management

Pessin, Wahlenberg, and Chapman examined the natural reproduction quadrats at Urania, La. The 1928 crop of seedlings is still within its period of normally high mortality. Partial computation shows the following figures for mortality between April and November 1930: in Greely Pasture, longleaf 59%, shortleaf 58%, and loblolly 83%. In Chapman Forest the mortality of longleaf is 74% on the land burned before seeding, and 68% on the protected area. There are, however, still sufficient numbers for a good stand on both areas. Due to an undetermined cause, small longleaf seedlings in the grass at Urania, La., are developing at a noticeably more rapid rate than at McNeill, Miss.

Measurements

At Starke a study of the relative accuracy of different types of hypsometers was made. It was found that an accuracy of about 5% may be expected where measurements are taken five years apart.

Schumacher of the Washington office spent about ten days in the field becoming acquainted with the problems of growth and yield of the bottomland hardwoods.

Types

Pessin submitted a preliminary classification of types based on soil moisture to the section meeting of the Society of American Foresters at Alexandria for discussion.

Wyman completed his type descriptions and submitted them to Professor Hawley at the Yale School.

The hardwood men spent some time in the field in analyzing various hardwood stands for the purpose of type classification. As a result of this work the list of hardwood bottomland types has been condensed to fifteen and each described.

Hardwoods

During the first week of November Lentz was in the field with Winters, Bull and Coile of the hardwood growth and yield studies. Numerous stands of bottomland hardwoods were studied in Tunica County and considerable time was devoted to dendrological and type classification work. Most of the timber found in Tunica County lies outside of the levees.

Messrs. Munns, Frothingham and Schumacher accompanied Lentz on a trip through the northern portion of the silt loam uplands and saw the badly eroded areas of Carroll, Lafayette and Marshall Counties, as well as the smaller area at Holly Springs where intensive control work is going to be carried on.

At Memphis, Schumacher, Winters, Bull and Lentz interviewed Mr. Donald Brewster of the National Lumber Men's Assn. and later had a most interesting session with Mr. Turner, Pres. of the Turner Faber Love Company, one of the largest hardwood operators in the south. Mr. Turner was particularly interested in the new hardwood research program. His company is holding several large areas which have been cut under a selection system and on which they plan another cut 7 years after the first.

They also visited the Memphis office of the Army Engineers engaged in flood control work. Through the agency of the Curtiss Flying Service aerial photographs have been taken of a large portion of the delta from Helena, Arkansas north. The possibilities of using some of the photographic maps in connection with the erosion work and the hardwood survey was discussed and the Engineers thought it would be possible for us to use what material they have collected.

During the month instances of remarkable growth were noted. On a bar of the Mississippi River near Helena Landing, Miss., a cottonwood tree three years old at ground height attained a height of 20 feet and a breast high diameter of 1.9 inches. This tree was growing on a clay loam soil. Within a few feet on a small bar of silty sand another cottonwood had grown to a height of 10 feet in two years.

On many of the river bars willow, probably Salix nigra, established itself in very dense stands. On such a bar the number of 2 year seedlings was determined on a plot 1/1000 of an acre in area. The species and the distribution of seedlings by size were as follows:

Height in Feet	Number of Seedlings		
	Willow	Cottonwood	Sycamore
1	9	38	1
2	55	5	
3	91	8	
4	93	1	
5	69		
6	61		
7	26		
8	10		
9	1		
10	1		
Total	416	52	1

Erosion

During the first three weeks of November, field work was carried on and two topographic maps were made of eroded land near Holly Springs, Miss. The first, a small scale map covering about 200 acres, (mostly the property of the Holly Springs Branch Experiment Station) was made to show the general location of several eroded areas, particularly one area of 5 acres on which it is planned to proceed with intensive studies of soil erosion. A second map on a large scale was made of the latter area showing with as much detail as possible, the rims of the gullies, their depth, etc. This map will be used as an aid in formulating plans for studies of run-off and soil movement under varying types of gully control. Three of the most comparable gullies will be used in starting the work, one to remain as a check and the others to be planted to different tree species.

This gullied area is part of the Holly Springs Branch Experiment Station property and cooperation from that source is expected.

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SOUTHWESTERN FOREST AND RANGE EXPERIMENT STATION

All of the station force except Campbell and Camfield of the Jornada are now in Tucson for the winter. Hendricks, Cassidy, Bliss and Hornibrook moved down from Fort Valley shortly before Thanksgiving, but not in time to miss the first big snowstorm.

Arrangements are being made for weekly or bi-weekly biological meetings during the winter months, to be attended by members of the experiment station, the Biological Survey, the Desert Laboratory, and members of the University engaged in research work closely allied to that of the station.

Forest Management

One of Hornibrook's last field jobs before leaving Fort Valley was to re-bait porcupine poison trees on the experimental forest and several other experimental areas. Nearly all of the cups filled last year were found to be empty and many of them had been gnawed, some to the extent of requiring replacement. Hornibrook reports finding remains of dead porkies under or near a number of baited trees. One must look closely to find the dead bodies at this season of the year because nearly all of the poisoning took place last winter, and usually all that remains now is the bones of the head, and quills, and these are often partly covered by grass or pine needles. Undoubtedly, a considerable number of bodies are dragged away by coyotes. Occasionally one finds a bunch of blue feathers, indicating that a blue jay let curiosity get the better of prudence. In one instance a dead Abert squirrel was found under a poison cup. Very little recent porcupine damage is now in evidence on areas which have been poisoned two years or more.

Hornibrook recently accompanied a party of Carnegie Desert Laboratory men to Port Libertad on the east coast of the Gulf of California. He reports some queer looking "forests" on the Sonora desert. Among the more conspicuous "trees" are the Boojum tree and the Sahuasa cactus. The former grows 30 to 40 feet tall and has a fleshy, tapering trunk resembling an inverted carrot. The Sahuasa cactus is somewhat like the giant Sahuara of southern Arizona, but is larger and more branching. Its branches furnish a nesting place for eagles which carry in great quantities of sticks, twigs, etc. The Carnegie Institution is maintaining records of temperature and precipitation on the Sonora desert.

Revision of reports on the Experimental forest and natural areas, in accordance with the latest modification of Regulation L-20, has received attention during the past month. At a recent meeting of the Committee on these areas, it was decided that those portions of the reports dealing with the Purpose and the Plan of Management should be written by the experiment station. The purpose of natural areas, and the distinction between natural areas and experimental forests is clarified in the new instructions. In drawing up plans of management for natural areas the writer has been impressed by the difficulty, if not impossibility, of applying a literal interpretation of the ideal sought in natural areas. Theoretically, an area of 1000 acres can be fenced, protected against all forms of "use" and thus maintained in absolutely natural state. But what do we mean by natural? If the

timber is destroyed by insects or fire, that is natural, but clearly we don't want that to happen. According to forest entomologists, areas of mature western yellow pine are likely sooner or later to be attacked by bark-beetles. Are control operations permissible? Without adequate roads and trails, fires are more likely than not to do serious damage, especially if grazing is prohibited. Exclusion of hunting may favor the increase of deer, antelope or elk to such extent as to endanger the future of the forest. One may well ask whether in the long run a policy which permits carefully regulated grazed, control of game, and the building of roads and trails adequate to facilitate protection against fire and insects is not better adapted to maintaining natural forest conditions than a policy of total exclusion.

Even the much decried camper and picnicker is less of a menace to natural conditions than he is reputed to be. This class of visitor seldom ventures more than a hundred feet off a road. Distinction should be made between densely populated regions and those which never can be other than thinly populated. By selecting areas off the main highways and away from towns, it is doubtful whether in the Southwest it will ever become necessary to adopt prohibitory measures against the public. Of course, public camp grounds should not be located on a natural area. The accounts which we read of soil deterioration and erosion in consequence of human visitation probably deal invariably with areas on which crowds are deliberately invited.

Insistence upon unnecessarily high standards in the preservation of natural conditions is likely to react unfavorably upon the entire movement. Every forester knows that the administration of the national forests must necessarily be more or less crude for many years to come. To expect ideal management of natural areas is unreasonable. The attitude of the average forest administrator toward natural areas is one of tolerance, but not enthusiasm. Obviously, the success of the movement requires wholehearted cooperation from forest supervisors and rangers. Research should, therefore, be very careful to avoid setting up requirements which can not be complied with or which are not necessary.

Forest Influences

Heavy snows during the second and third week of November terminated the field season for projects in northern Arizona. Hendricks, Cassidy and Bliss came into Tucson completing the move of personnel into the new headquarters for the combined Southwestern Station.

Cooperrider returned to headquarters on the sixteenth after a month in the field spent at the Supervisors' conference at Roosevelt, at the Fort Valley Station on the season's finish of the pine reproduction project, and a visit to the Clarkdale-Jerome smelter district.

Patches of dense reproduction common to the yellow pine type along the Mogollon Rim of the Arizona Plateau are frequently beaten down by heavy snow. Evidence of this condition is prominent as

crooked poles and a matted interlocked state of the dense patches. While traveling the roads in the Long Valley region of the Coconino forest after the snowfall of November 13 and 14 it was frequently necessary to kick the stems of long poles to shake loose the snow and allow them to spring back out of the right-of-way. Although fir is but sparsely scattered throughout this region it was very noticeable that the stems of firs remained upright, that fir was uninjured. The question came to mind as to whether snow might not be one factor favoring the establishment and rapid growth of fir under competition with dense pine reproduction, the increase in fir where mature fir is exceedingly rare. Control of ground fires during the last twenty or more years would seem to explain the very evident increase in pine reproduction that has resulted in dense thicket formations. Ground fires probably destroyed a scattered fir reproduction in the past.

November is usually a dry month in the brush belt. Storms during the middle and latter part of the month have brought the 1930 precipitation to far above the normal. At Roosevelt, for example, the 1930 November rainfall exceeded that for the same month for the preceding five years in total. The growth and density of summer annual grama grasses in the lower Tonto Basin exceeded that of any year observed since 1922. November rainfall and mild temperatures have resulted in an unusual growth start of winter annual weeds, and a very exceptional prevalence of Selaginella (everlasting plant.) The summer annuals have exerted a very prominent influence on soil erosion during the November rains. Experience has shown that much may be learned from a study of the influence of annual grasses occupying soil denuded of perennial grasses; that the influence of annuals when they occur in comparable stands is characteristic of the influence of perennial grasses.

JORNADA EXPERIMENTAL RANGE

Range and Climatic Conditions

The Jornada forage supply is holding up quite well with 70 to 75 per cent of the average quantity for November still on the ground. Light rains which occurred from time to time throughout the month have reduced the losses of forage by wind breakage and trampling. Also, a fair crop of winter weeds is supplementing the mature forage to some extent.

Sandstorms bearing an unusually large quantity of sand for November occurred on two occasions during the past month. The lighter than usual forage cover is, no doubt, responsible for the sand movement.

Activities

Campbell is devoting most of his time to his Grazing Capacity manuscript and to administration. On November 21, he made a talk to the H. H. Brooks Local Farm Bureau on the Relationship of the Jornada Work to the Agriculture in the Rio Grande Valley.

Canfield's time was divided between the compilation of reconnaissance data and the Clipping Studies manuscript.

Bomberger spent the greater part of the month on quadrat chart computation.

Visitors

Mr. Musgrave spent November 24 and 25 on the Jornada. He gave a very interesting talk before the local Lions Club. In judging the effectiveness of his talk on a basis of the number of "Lions" which ganged around the speaker to discuss game management after the luncheon was over, there is no doubt that he aroused a lively interest in this phase of forest management.

Dr. Walter P. Taylor and Dr. Vorhies paid us a hasty visit November 25. These gentlemen succeeded in gathering some interesting data regarding the coyote as it is known in this region.

Santa Rita Experimental Range

More on the Volume Factor in Range Reconnaissance

During the past few years there has been considerable discussion concerning the need for a volume factor in range reconnaissance estimates in order to account for the apparent differences in volume production of our many range grasses. Probably the need for this was nowhere better illustrated than on the Santa Rita, which was covered by reconnaissance last year. In the foothill type - which supports a rather good density of slender, ring and hairy gramas, together with curley mesquite - the reconnaissance estimates were very close to those secured from long time actual use records, while in the mesa type - supporting Rothrocks and black gramas in less than one-half the density of the foothill type - the reconnaissance figures were considerably under those indicated as proper for the type by past actual use records. The density ratio between the mesa and foothill types is roughly 1 to 2 with a slightly larger ratio in reconnaissance carrying capacity while the actual carrying capacity ratio (from fifteen years of actual use records) is approximately 1 to 1-1/2. Unquestionably the somewhat heavier growth of winter and spring annuals in the mesa type tends to reduce the difference in ratio between the two types, though on the basis of certain clipping studies conducted at the Santa Rita, we may also consider that the difference in volume of forage produced by various grass species is a factor to be considered

The clipping study was started with a view to securing information on a number of phases of range management and the phase dealing with the relative volume of forage produced by different grasses has

given us some very definite data. For all practical purposes one series of quadrats, that were clipped at varying intervals of time through the summer down to 2 inches above the ground (as representing an approximately proper degree of grazing use), will be sufficient to bring out the difference in production among six important grasses which in various combinations supply a very large part of the forage supply over southern Arizona ranges. The results of the volume phase of the study are given in the following table which has been compiled so as to show the production for each species on a comparable area basis, i.e. - the density expressed in square centimeters at the close of each summer divided into the total production in centigrams for the summer.

Five Year Average Production in Centigrams
per Square Centimeter of Six Range Grass Species

Clipped at Intervals after growth started as follows	Foothill Type				Mesa Type	
	Curley Mesquite 1.	Ring Grama 2.	Hairy Grama 3.	Slender Grama 4.	Black Grama 5.	Rothrock Grama 6.
Weekly	3.96	4.41	7.13	6.49	7.73	11.48
Bi-weekly	3.92	4.20	4.86	7.24	8.04	15.03
Monthly	3.84	4.79	10.79	11.55	10.78	19.06
Close of Season	2.31	4.44	8.39	8.21	13.38	14.59
Weighted Averages	3.76	4.44	7.98	8.09	10.26	14.81

1. Hilaria belongeri
2. Bouteloua chondrosioides
3. B. hirsuta
4. B. filiformis
5. B. eriopoda
6. B. rothrockii

Study of the table reveals a surprising difference in production among the six species studies, curley mesquite yield being lowest and stepping up in order as follows: ring grama, hairy grama, slender grama, black grama and finally, Rothrock's grama with very much the highest yield amounting to almost four times that of curley mesquite on the average. Hairy and slender gramas are the only two species that do not show any consistent differences and average up with about the same production. The remaining species show very definite differences, under all clipping intervals, that are sufficiently pronounced to indicate the need for considering the volume factor in reconnaissance carrying capacity estimates. The relatively high production of species in the mesa type as compared to those in the foothill type explains in part at least why the actual carrying capacity ratio between the two is not as large as the variation in reconnaissance estimates - based on density - between the two types would appear to indicate.

In actual application of the volume factor there would seem to be little need for changing the basic method of collecting reconnaissance data. We already have certain variables that do not enter into the original estimates such as winter and spring annuals occurring on some ranges and not on others and coming in some years and not in others, as well as an annual variation in forage production due to climatic differences. It is only reasonable to suppose that there may be some variation in the volume factor between years and particularly between different localities, and until we know more about the matter from actual studies in different regions little could be gained in changing the basic methods. Then too there would be the question of relative importance of species. Little could be gained by increasing the amount of compilation for minor species in a type no matter how much they might vary in volume production from the dominant species.

As a start the volume factor might well be taken care of by an adjustment in the forage acre requirement that could in turn be changed as our knowledge of the volume factor increased.

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MANUSCRIPTS

NORTHEASTERN

The Northeastern Forest Experiment Station - Forest Research Problems of the Northeast and the Role of the Federal Government in their Solution. C. E. Behre (For "Up-Stater.")

ALLEGHENY

Federal Research in Artificial Forestation in the East. R. D. Forbes (To Penna. Dept. of Forests and Waters.)

The Federal Forest Experiment Stations. R. D. Forbes (To New York Times)

Converting Factors for Some Stacked Cords. G. Luther Schnur (For Jour. of For.)

A Test of Hypsometers on Short Trees. H. F. Morey (Jour. of For.)

Climatological Charts for the Allegheny Forest Region. H. F. Morey (For Weather Review)

CENTRAL STATES

How Dry Is It? J. T. Auten (Michigan Agriculturist)

A Comparison of Porosity of Virgin Forest and Cultivated Soils. J. T. Auten.

Grazing the Farmwoods in the Central States. R. K. Day. (Michigan Agriculturist)

SOUTHERN

Hardwood Research at the Southern Forest Experiment Station. E. L. Demmon (For Southern Lumberman, Christmas issue)

French Face Experiments in Turpentining. V. L. Harper (Jour. of For.)

IN PRINT

Lowdermilk, W. C. and Li, T. H.	Forestry in denuded China. The Annals Am. Acad. of Polit. and Social Sci. Vol. 152, Nov. 1930.
Lowdermilk, W. C.	Rev. of : The Influence of Forests on Climate and Water Supply in Kenya (British East Africa) by J. W. Nicholson. (For. Dept. Bul. (Africa) No. 2. (Jour. of For., October, 1930)
Lutz, H. J.	Effect of Cattle Grazing on Vegetation of a Virgin Forest in Northwestern Pennsylvania. (J.A.R. Oct. 1930)
Munger, Thornton T.	Ecological Aspects of the Transition from old Forests to New. (Science, Oct. 3, 1930).
McArdle, R. E. and W. H. Meyer	Yield of Douglas Fir in the Pacific Northwest. U. S. Dept. of Agr. Bul. 201.

Logging Output Bulletin

Early in November Mr. Bradner completed a write-up of the results of the Region's logging output studies for publication as a departmental bulletin. The completed manuscript was sent to Mr. J. Girard for his comments and approval. The bulk of the studies on logging output was initiated and carried through by Mr. Girard and Mr. F. J. Klobucher, when both were members of the Region One personnel. Recently in connection with regional woods and mill studies, output data on several phases of logging have been obtained.

Mr. Bradner is planning to meet with Mr. Girard so that the manuscript may be gone over together. A time and meeting place could not be arranged during November.

Region One Finds Need for the Standardization in Lumber Grades

During the latter part of the month Mr. Bradner assisted Mr. O. C. Bradeen, Purchasing Agent, and Mr. Fickes, In Charge of Improvements, in writing up new specifications for getting out bids for approximately 210 M feet of lumber. The Region plans to cut up in the Spokane Warehouse the lumber necessary for 100 ready-cut lookout houses. The bulk of the lumber called for is cedar, though small amounts of western yellow (Pondosa) pine boards and larch-fir dimension are also needed.

Inability of a number of Inland Empire mills to furnish cedar boards and siding in the grades desired under the original bids sent out, necessitated opening up the bidding to West Coast mills. Mill practice does not always follow the Association's grade set-up. It is, therefore, difficult for anyone unfamiliar with mill practice to obtain the quality of lumber desired by basing specifications upon Association grading rules alone. On the basis of the Federal Board Specifications for lumber and the rule books of the two associations, bids for the lumber were again set up, opening the competition to Coast mills. The cedar grades under the West Coast Association are not exactly comparable with the same grades set up under the Western Pine Manufacturers Association rules, i.e., the quality of the lumber is not the same, for instance, under the No. 2 common grade of both associations. This means that in making up the bids to get the grade or quality of lumber desired a higher numbered grade under one association's rules must be called for to meet a lower numbered grade under the rules and standards of the other association. Unless a great deal of care is taken in arriving at the desired comparable grades one or the other of the associations is very apt to protest that their lumber is being discriminated against. Specifications must also be so set down that there will be no question in the mind of the approving officer at Washington that the rightful bid has been accepted.

The above is given to illustrate the need for standardization in lumber grades, particularly for lumber from the same species coming from the same general region. The combining of the Western Pine Manufacturers Association and the California Pine Association in the grading and inspection of western yellow pine is a step in the right direction.

Study Course

The Region One Office of Products is preparing a short study course to allow Forest officers an opportunity to become better informed on what is and has been done in Products work. The course will be quite general in character. What is Products Research, what are the problems, and how important the need for such work, are some of the questions that will be answered with particular reference to this Region. Woods and mill studies and preservatives and preservation methods as they apply in this Region will come in for special attention.

New Lantern Slide Set Received from Madison Laboratory

At the request of this office the Forest Products Laboratory has furnished Region One with a new and complete set of lantern slides showing the work of the Laboratory. A talk to go with the pictures has been prepared and it is hoped that many people scattered throughout the Region will be given a chance to see the pictures during the coming and following winters.

Selective Logging

Compilation of the data on the A.C.M. relogging study is progressing quite rapidly under the supervision of Mr. Anderson. It is hoped to secure the services of a detailed Forest officer in the near future for a month. This will facilitate preparation of the final report by February 1, 1931.

The analysis to date has disclosed some interesting and striking differences in utilization practices of 40 years ago and the present time. Merchantable length and top utilization diameters in the old days would give even the most wasteful operator of today the "heeby jeebies". The following tabulation shows a comparison of these variables by tree diameters for yellow pine.

Yellow Pine

Merchantable Tree Length Feet	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38
1888	-	24	30	34	36	38	38	40	40	42	42	42	44	44	44
1927	30	38	46	50	56	60	62	66	68	70	72	72	74	74	76
Difference	-	14	16	16	20	22	24	26	28	28	30	30	30	30	32
Top Dia. Inches Av. Tree															
1888		7.1	8.9	10.9	12.6	13.8	15.0	16.0	17.0	18.2	19.5	21.1	22.7	24.6	26.9
1927	5.5	6.6	7.3	7.8	8.3	8.3	9.4	10.0	10.6	11.6	12.8	14.2	15.8	17.8	20.1
Difference	-	.5	1.6	3.1	4.3	5.0	5.6	6.0	6.4	6.6	6.7	6.9	6.9	6.8	6.8

Madison Forest Plans Treatment of Posts for Drift Fences

While taking up various matters at the Regional Office from November 17 to 20, Forest Supervisor Walter Derrick conferred with Whitney and Bradner in regard to equipment needed for an open-tank treating plant with capacity of approximately 100 creosoted posts per day. It is estimated that if the requirements of proposed co-operative range improvement drift fences for the next two years are supplied in the form of lodgepole pine posts the annual output of treated posts would need to be from 4500 to 5000 posts per year. According to the plan discussed this plant will be located on Jack Creek a tributary of the Madison River where there is an abundant supply of lodgepole pine timber.

A comprehensive collection of data including suggestions on the size of treating tanks, specifications for their construction, estimates of the various costs and sample schedules for open-tank treatments were furnished Mr. Derrick in typewritten form.

A former member of the Forest Service who is now a rancher in the Madison Valley desires to co-operate with the Service in operating this proposed plant. There appears to be an excellent chance to develop a post treating service for this community where some of the stockmen are inclined to favor the use of steel fence posts.

In July of the present year the Forest Service was asked to secure bids on a total of 2216 steel posts for the Elk Lake Cooperative Drift Fence Project on the Madison. At that time the lowest cost of pressure-treated lodgepole pine posts shipped in from the Spokane region would have been 65¢ as compared with 45 1/8¢ for the steel post. Superiority of the full-length creosoted pine post could not be given much consideration in this case.

Butt-treated lodgepole pine posts with 5" to 6" tops which could be depended on to give more satisfactory service than the steel posts, could be turned out in this locality at a cost of around 38¢ each.

Lumber Prices & Movement

Av. Mill-Run Prices	Annual, 1929	1st Q., 1930	2nd Q., 1930	3rd Q., 1930
Idaho White Pine	$34.44	$35.33	$34.28	$33.72
Western Yellow Pine	26.17	24.57	23.29	19.27
Larch-fir	20.29	18.35	18.28	16.28
White Fir	20.94	19.45	18.45	15.65
Spruce	24.23	23.51	22.76	20.42

Shipments and Cut	1929	1930
Shipment	150,230	128,582
Cut	168,498	106,825

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FOREST PRODUCTS - Region 6

General

Gibbons left Portland on November 26 for a three months detail in the Washington office. Spelman is still away on leave because of ill health. Miss Evelyn Leonard, Junior Typist, was given a temporary appointment, beginning November 18, to assist in the compilation of field data collected for the survey of sawmill waste in the Douglas fir region.

Logging and Milling Studies in the Western Yellow Pine Region

At the request of Forest Management, Gibbons and Johnson have prepared tabulations showing the overrun of western yellow pine logs as indicated by the Shevlin-Hixon Co. and Mt. Emily Lumber Co. mill scale studies. The logs in the Shevlin-Hixon study ranged from 6 to 36 inches in diameter, and in the Mt. Emily 7 to 38 inches. The following tabulation shows the overrun for sound and defective logs, also sound logs, and defective logs in the respective studies:

Character of Logs	Shevlin-Hixon Study: No. of Logs	Shevlin-Hixon Study: Overrun based on No. 5 Com. & Btr.	Mt. Emily Study: No. of Logs	Mt. Emily Study: Overrun based on No. 5 Com. & Btr.
		%		%
Sound and Defective	2965	14.52	2168	21.11
Sound	2765	15.16	1954	21.40
Defective	200	8.25	214	18.96

A table was also prepared showing the comparative overrun in the two studies based on the number of logs from timber marked for cutting in accordance with Forest Service practice in the Shevlin-Hixon study. On the basis of 1898 logs ranging from 6 to 36 inches in diameter, the overrun in the Shevlin-Hixon study was 12.73 per cent and in the Mt. Emily study 17.49 per cent.

Survey of Sawmill Waste in the Douglas Fir Region

The first week of November was spent by Hodgson and a crew of eleven men in completing the field work required for the survey of sawmill waste, which was referred to in last month's report. This phase of the study was conducted in six representative sawmills cutting Douglas fir. Four of the mills studies are located in western Washington and two of them are in western Oregon. Two mills are located inland, one of these being equipped with a circular headsaw while the other one is operating a band headsaw. The remaining four mills are located on tidewater and are largely sawing for the export trade and for water shipments to California and the East Coast markets.

Since returning to Portland, Hodgson has devoted all of his time to the compilation of the data secured from the field work.

During the course of the field work a study of the sawing practice at each mill was made and the great variety of nominal sizes of lumber produced by Douglas fir sawmills, as brought out by the data, is quite amazing. During one shift at one of the mills studied, for example, fifty-one different sizes of lumber were manufactured, not including the differences in lengths. The sizes ranged from 1/2 inch x 8 inches to 24 inches x 24 inches. (Lengths varied from 6 feet to 40 feet). In the hemlock mills that were studied last February there are only twelve or fifteen sizes represented in the lumber production, while in the western yellow pine mills of eastern Oregon and Washington from twenty-five to thirty sizes only are being manufactured.

Several hundred accurate measurements of the lumber being made at each of the six sawmills studied were made in order to learn the actual sizes to which the lumber was being sawed. The actual size of the lumber

is a necessary attribute to the sawmill waste studies in determining the exact cubic volume of wood contained in the manufactured lumber. The following table shows a "Comparison of Sawing Practice at the Six Representative Douglas Fir Mills" as represented by the nominal and actual dimensions of a few of the more common lumber sizes.

With few exceptions, which are marked in the table with an (°), it will be noted that practically all of the sizes at the several mills are being sawed more than full.

In other words when a customer buys a shipment of 1 x 6's (nominal size) the average actual size for the shipment may vary from 1" x 6-10/64" to 1-8/64" x 6-4/64", depending upon the sawmill from which it is purchased. The variation in sawing practice at the different mills is quite noticeable as indicated by the table.

Comparison of Sawing Practice at Six Representative Douglas Fir Sawmills in the Douglas Fir Region of Western Oregon & Washington

Nominal Dimensions Inches	Actual Dimensions - Expressed in 64ths of an Inch. Averages[1]					
	Mill J	Mill K	Mill L	Mill M	Mill N	Mill O
	64ths	64ths	64ths	64ths	64ths	64ths
1 x 3	67 x 195	67 x 195	72 x 198		66 x 200	
1 x 4	68 x 261	65 x 258		69 x 264	65 x 266	65 x 268
1 x 6	68 x 389	66 x 389	71 x 388	65 x 392	66 x 388	64 x 398
1 x 8	67 x 521	75 x 516		68 x 518	67 x 521	64 x 514
1 x 10	-	-	70 x 645	68 x 648	65 x 643	68 x 654
1 x 12	68 x 778	65° x 776	67 x 774	67 x 780	69 x 772	64 x 780
2 x 3	136 x 193	136 x 194	132 x 200		131 x 201	
2 x 4	131 x 260	133 x 265	133 x 260	136 x 257	129 x 265	126° x 261
2 x 6	131 x 392	134 x 392	132 x 390	130 x 387	128 x 389	128 x 394
2 x 8	130 x 519	132 x 517	132 x 516	135 x 531	127 x 518	124° x 523
2 x 10		131 x 640	131 x 644		130 x 646	125° x 647
2 x 12	131 x 777	133 x 784	134 x 770		130 x 774	128 x 776
3 x 4			191° x 259			
3 x 7			196 x 448			
3 x 9	195 x 587		191° x 572°			
3 x 11	196 x 715					
4 x 4	254° x 261		256 x 265		259 x 271	254° x 267
4 x 6	259 x 381°		259 x 382°			
4 x 11	258 x 720					
6 x 6		388 x 399	381° x 384		388 x 392	
6 x 8						
10 x 10					643 x 656	
10 x 12		778 x 787	755° x 769		774 x 776	771 x 777

[1] The averaged results of several hundred exact measurements taken on the green chain at each of the sawmills studied. The fitures presented in this table represent only a few of the more common lumber sizes being produced by the sawmills.

° Lumber sizes, the average of which were sawed scant, or less than the nominal size. (Measurements made in October and November, 1930).

Publications

Gibbons' paper, "Falling and Bucking Study in the Douglas Fir Region", which was read at the meeting of the Pacific Logging Congress last October was published in the November issue of "West Coast Lumberman". As mentioned in last month's report this paper dealt with the felling and bucking study which Products is conducting in the Douglas fir region.

The May, 1930 issue of the Journal of Forestry carried a four and one-half column review of Hodgson's report "Logging Waste in the Douglas Fir Region". The review was quite complete in summarizing the contents of the report and made certain recommendations regarding possible ways for reducing logging waste in the Douglas fir region.

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